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(54) Title: AUDIO AND DATA COLLABORATION AND COORDINATION SYSTEM

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(57) Abstract

There is disclosed systems and methods for coordinating IP audio calls with data collaboration sessions, including voice and data, over a network, such as the Internet (24). This is accomplished by providing an identifying data field to accompany the audio call on its journey from caller (sender or client, 20) to intended recipient (receiver or agent, 22a, 22c), this identifying data field also being employed as an identifier of the corresponding data collaboration, between the caller, and the intended recipient, allowing for the parallel and coordinated transmission of voice and data over separate communication channels.

(57) Abrégé

La présente invention concerne des systèmes et des procédés de coordination de communications audio de protocole IP avec des sessions de collaboration de données, y compris voix et données, dans un réseau, tel qu'Internet (24). Pour ce faire, on fournit au destinataire (récepteur ou agent, 22a, 22c) prévu un champ de données d'identification pour accompagner dans son trajet l'appel audio en provenance de l'appelant (émetteur ou client, 20); ce champ de données d'identification étant également utilisé comme identificateur de collaboration de données correspondantes, entre l'appelant et le destinataire prévu, permettant ainsi l'émission parallèle et coordonnée de voix/données dans des canaux de communications séparés.

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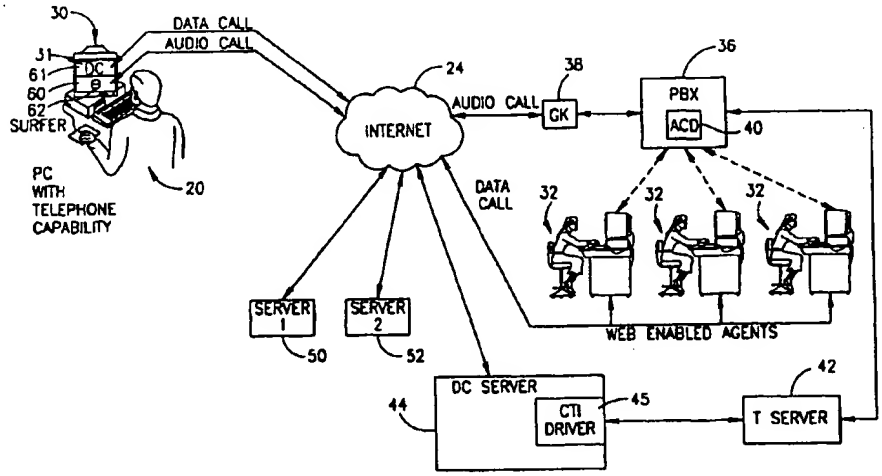

(57) Abstract

There is disclosed systems and methods for coordinating IP audio calls with data collaboration sessions, including voice and data, over a network, such as the Internet (24). This is accomplished by providing an identifying data field to accompany the audio call on its journey from caller (sender or client, 20) to intended recipient (receiver or agent, 22a, 22c), this identifying data field also being employed as an identifier of the corresponding data collaboration, between the caller, and the intended recipient, allowing for the parallel and coordinated transmission of voice and data over separate communication channels.

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AUDIO AND DATA COLLABORATION AND COORDINATION SYSTEM

CROSS REFERENCES TO RELATED APPLICATIONS

This patent application claims priority from and is related to U.S. Provisional Patent Application No. 60/124,369, entitled: ENABLED CALL CENTER SYSTEM, filed on March 15, 1999, this U.S. Provisional Patent Application incorporated by reference herein.

FIELD OF THE INVENTION

The present invention is related to voice and data applications over Internet Protocol (IP) networks, and particularly to systems and methods where an audio call is coordinated with a data collaboration session over a network, such as the Internet.

BACKGROUND OF THE INVENTION

The Internet has emerged as an effective way to speed transactions and provide service to an ever growing number of users that by early 2000 is expected to exceed 47 million. Along with this growth in users, has come the growth of electronic commerce or "e-commerce", online transactions typically involving the sale of goods and services. Thousands of businesses have entered into e-commerce, realizing the lucrative profits that can be gained by reaching this Internet user population with web-based services, advertising, product promotion and sales.

In a typical e-commerce scenario, an audio call is made between a client and the agent over the Internet. This audio call typically travels through a PSTN-to-IP gateway, and then to the agent's PSTN PBX. The conventional protocols associated with this PSTN technology are limited, and thus, any accompanying data transmissions are limited, if even possible.

SUMMARY OF THE INVENTION

The present invention improves on the contemporary art by providing systems and methods for coordinating IP audio calls with data collaboration

sessions, including voice and data, over a network, such as the Internet. This is accomplished by providing an identifying data field to accompany the audio call on its journey from caller (sender or client) to intended recipient (receiver or agent), this identifying data field also being employed as an identifier of the corresponding data collaboration, between the caller, and the intended recipient, allowing for the parallel and coordinated transmission of voice and data over separate communication channels.

Embodiments of the present invention are directed to call center systems that allow for data collaboration sessions, such as a web-enabled call center for audio and data collaboration sessions between a sender, typically a client and a receiver, typically a web-enabled agent, the system including means for placing at least one first cosurfer identifier, i.e., an Automatic Number Identifier (ANI), in: at least one audio component for placement in an audio call of at least one sender; and at least one data collaboration component for placement in a data call of this at least one sender.

The system also includes at least one data collaboration sever configured for: receiving first data corresponding to the audio call from the at least one sender to the at least one receiver, with this first data including at least this first cosurfer identifier, from the at least one sender and a second cosurfer identifier, from the at least one receiver, the first cosurfer identifier is different than the second cosurfer identifier; receiving second data including the first cosurfer identifier, from the data call from the at least one sender; receiving third data including the second cosurfer identifier from a data call from the at least one receiver; and processing this first second and third data, to connect a data call between said at least one sender and at least one receiver, this data call between the at least one sender and the at least one receiver in parallel and coordinated with the audio call between these same parties.

Embodiments of the present invention are also directed to methods for conducting audio calls and data collaboration sessions over wide area networks, for example, the Internet, between a sender, typically a client and a receiver, typically a web-enabled agent. These embodiments typically comprise providing a sender with at least one audio component and at least one data collaboration

component, providing the sender with a first cosurfer identifier, i.e., an Automatic Number Identifier (ANI), and copying the first cosurfer identifier into at least one audio component and at least one data component of the at least one sender.

The sender then sends this first cosurfer identifier by the at least one audio component, and it joins with a second cosurfer identifier, this second cosurfer identifier being different than the first cosurfer identifier, and coming from at least one intended receiver in accordance with an audio call between the at least one sender and the at least one intended receiver. This first cosurfer identifier is then sent to at least one server by the data collaboration component in accordance with a data call. This data call from the sender is then connected with a data call from the at least one intended receiver, as a result of the receiver having transmitted this second cosurfer identifier to the at least one server. This results in a data call between the at least one sender and the at least one intended receiver in parallel and coordinated with the audio call between these same parties.

BRIEF DESCRIPTION OF THE DRAWINGS

Attention is now directed to the attached drawings, wherein like reference numeral or characters indicate corresponding or like components. In the drawings:

Fig. 1 is a diagram of an embodiment of the present invention in use in an exemplary application; and

Fig. 2 is a flow chart of a process useful in implementing an embodiment of the present invention.

DETAILED DESCRIPTION OF THE DRAWINGS

Fig. 1 shows the present invention in use, from the side of the client 20, typically the caller or sender, and the side of the agent(s) 22a-22c, typically the recipient or receiver. The client and agent sides are connected via a wide area network (WAN), typically the Internet 24.

From the client side, the client 20, has a multimedia PC 30 (e.g., with a Pentium® from Intel Corporation, Santa Clara, California 95052, CPU) with

voice and data capabilities. The multimedia PC 30 employs an operating system such as Windows® NT® (from Microsoft Corporation, Redmond, Washington 98052) or the like, and is equipped with a suitable modem or other hardware for accessing a wide area network (WAN), here the Internet 24. The PC 30, with monitor 31, is also loaded with software that operates as a browser for the internet, exemplary browsers suitable for use here including Microsoft® Internet Explorer® (Microsoft Corporation, Redmond, WA) and Netscape® Navigator® and Netscape® Communicator®, the later two from Netscape Communications Corporation, Mountain View, California 94043.

On the agent side, are web enabled agents 22a-22c. While three agents are shown, this is exemplary only, for any number of agents (one or greater) is permissible in accordance with the present invention. These agents 22a-22c are typically equipped with multimedia PC's 32 with voice and data capabilities, and include browsers, in accordance with those detailed above. Each agent 22a-22c uses a regular (POTS) telephone for audio, typically voice. The PC's of the agents 22a-22c have a connection to the WAN, here the Internet 24 for data, and connect to a Private Branch Exchange System (PBX) 36 for voice.

The PBX system (PBX) 36 connects to the Internet 24, typically through a gatekeeper 38. For example, one gatekeeper 38 may be a VocalTec® Gatekeeper®, from VocalTec Communications, Ltd., Herzlia 46733, Israel, although a gatekeeper is not necessary.

Within the PBX 36 is an automatic call distribution unit (ACD) 40, that functions as a switch, to route voice calls to the selected agent 22a-22c, typically the first available agent. For example, one ACD suitable for use with this system is a DEFINITY G3 ACD from Lucent Technologies, Murray Hill, New Jersey.

The PBX connects to a Telephony Server (T-server) 42, that is configured to convert PBX telephony data into Internet Protocol (IP) data. For example, a suitable T-server for use with this system is a PacketStar™ Internet Telephony Server from Lucent Technologies, Murray Hill, New Jersey.

The T-server 42 connects to a Data Collaboration (DC) Server 44 that in turn, connects to the Internet 24. The DC server 44 typically includes a co-resident Computer Telephone Integration (CTI) driver 45. The DC server

provides the interface between an incoming client (customer) call, telephony gateway terminals and call center equipment, such as the ACD/switch, and the Internet 24. For example, the DC server and CTI driver are available as a VocalTec® Surf & Call™ Server (available from VocalTec Communications, Ltd., Herzelia, Israel).

Servers 1 and 2, indicated as 50, 52, are connected to the Internet 24. These servers 50, 52 are exemplary of the endless number of servers that are connected to the Internet.

One server, typically the DC Server 44, but other servers such as Server 1 (50), for example, hosts a web-site that includes downloadable software. This software is configured to allow for the placement of contemporaneous audio, typically in the form of voice, and data calls between client and agent.

One exemplary software package suitable for the audio call component, that makes the audio (voice) call, is Surf & Call Center™ (VocalTec Communications, Ltd., Herzlia, Israel), having the Surf & Call® software from VocalTec Communications, Ltd., Herzlia, Israel, an embedded plug-in enabling web-to-phone call center applications from a standard web page. The data call can be made via a data collaboration (DC) component, typically in JavaScript or code within an applet, that is typically also on the DC Server 44. For example, one software package with a suitable DC component is a VocalTec® Cosurfer DC Component (from VocalTec Communications, Ltd., Herzlia, Israel), that is typically part of the Surf & Call Center™, detailed above.

The DC Server 44 or other server 50 also includes additional JavaScript code for processing the Automatic Number Identification (ANI) as detailed below. Once downloaded into the client's PC, the audio call component 60 and the DC Component 61 can, for example, appear on the monitor 31 (JavaScript or code applet not shown).

The audio call component, data call component, JavaScript code, and/or portions thereof can be on different servers and are not restricted to any particular server. Also, these components and portions thereof can be on storage media such as disks, CD's etc., as well as some portions on servers and some portions on storage media.

Another server, for example, Server 2 52 may serve as an ANI generator, discussed below.

An implementation of the process of the present invention will now be described. The user or client 20, his browser open, has downloaded software for the placement of contemporaneous voice and data calls along respective voice and data channels between the client 20 and the respective agent 22a-22c. Here, for example, the client 20 has employed the Surf & Call Center™, having the Surf & Call® software, an embedded plug-in, as detailed above, for facilitating an audio IP call between the client 20 and the agent 22a-22c. While the Surf & Call® software is shown, other suitable software for this application can be that with the ability to make an Internet Protocol (IP) telephony call from a web browser and the ability to transmit an ANI along with the audio call, the audio call in accordance with standard contemporary telephony.

The client 20 has also obtained, typically by downloading, a Cosurfer Data Collaboration (DC) component, such as the VocalTec® Cosurfer DC Component™ (VocalTec Communications, Ltd., Herzlia, Israel), for facilitating the data call to the DC server 44, along with JavaScript code. The JavaScript code functions in distributing the ANI to both the audio call component 60, here, the Surf & Call® software, and the data collaboration component 61, both components 60, 61 appearing as portions on the client's monitor 31.

Turning also to Fig. 2, the process continues, as an Automatic Number Identification (ANI) is generated in the browser of the client 20, such as in either JavaScript or in a Java applet. An ANI can also be requested from a server with code to reserve ANI's, request sequential numbers, generate random numbers, generate numbers from a database, etc. The resultant ANI need only be such that it is unique to each client, whereby any two clients do not have the same ANI at the same time.

This ANI serves as a unique identifier of the client's particular coordinated audio and data calls with the selected web-enabled agent in real time. The ANI is a cosurfer identification for the client 20, identifying the client 20 to the telephony system (i.e., in the audio call) and the DC server 44 (i.e., in the data

call), and typically passes through the respective audio and data calls made by the client 20 as a data field.

The ANI is a fifteen digit number that conforms to E.164, the specification for telephone numbers, as described in "Numbering Plan For The ISDN Era, Recommendation E.164", CCITT (1991), this document incorporated by reference herein. A number in accordance with this E.164 standard has its first three digits corresponding to a country code, with the remaining twelve digits a National Significant Number.

Here, the first three digits of the ANI are formed, as they are assigned by the same mechanism that generates the ANI, or by another mechanism, such as using a constant value. These first three digits mimic a country code as per the E.164 standard, but are not assigned to any country, as per the E.164 standard, at step 102. The remaining twelve digits are created randomly, via a random number generating program on the PC 30 of the client or via the Internet 24, from a server, such as Server 2 (52), or as otherwise detailed above, at step 104. These numbers are then brought together, at step 106, resulting in the ANI.

At step 108, the ANI is stored in the client's disk (in the client PC 30), typically in a browser cookie. This ANI is stored by means such as JavaScript code. By storing the ANI in a cookie, the next time that an ANI is needed by the client 20, it will come from this cookie, and not from random number generation methods, such as those detailed above.

The JavaScript code then sets the ANI, by copying it and setting one copy in the audio call component, here the Surf & Call® component (segment 60 in the screen shot of the client's monitor 31), at step 110; and setting another copy of the ANI in the data call component, here the Cosurfer Data Collaboration Component Applet (segment 61 in the screen shot of the client's monitor 31), at step 111. These two steps, steps 110 and 111, should be performed contemporaneously and/or in parallel, and preferably, simultaneously. Additionally, the ANI is placed into the data field allotted by telephony specifications to the phone number of the calling party, here the client 20, at step 110a.

With the ANI in the audio call and data call components, the audio call is initiated, at step 114. Here, the audio call initiation is in accordance with the standard H.323 protocol, this protocol being that of the Surf & Call® software. Specifically, audio call initiation with the audio component from the Surf & Call® software is via a Surf & Call® button or icon 62 (Fig. 1), that appears on screen 31 (for example as a pop-up) and is "clicked" (pressed) by a mouse or the like. Moreover, when the Surf & Call Center™ is employed to provide the audio component 60 and the DC component 61, the "clicking" or pressing of the Surf & Call® button or icon 62 starts the DC component 61 attempting to connect to the DC server 44, thus initiating the data call from the client 20, at step 115.

With respect to the audio call, the ANI travels with the audio call through the gatekeeper (GK) 38 so as to connect with the ACD 40 in the PBX 36, at step 116. If there is not a connection with the ACD 40 in the PBX 36, at step 116a, the process stops, until reinitiated by the client 20. At optional step 116a', the audio call is again initiated (step 114 performed again). Once there is a connection with the ACD 40 in the PBX 36, at step 116b, this is a Start Call event, as the ANI is passed with the call to this ACD 40 (with data corresponding thereto ultimately passed to the DC server 44, as detailed below), at step 118.

With respect to the data call, the Cosurfer Data Collaboration (DC) component, typically the applet, connects the client PC 30 to the DC Server 44 at step 115a, typically over a TCP/IP socket link. This connection results in the client 20 data call to the DC server 44, where the ANI and the cosurfing data, including, for example, shared Uniform Resource Locators (URLs) are passed to the DC server 44. Alternately, the DC component can include software programmed such that the start call event also initiates (starts) the above described data call.

These two call initiation steps, steps 114 and 115 should be performed close in time and in parallel, and preferably, simultaneously. This can be done by programming the audio and DC Components to initiate the respective audio and data calls at the times desired.

Once the audio call with the ANI is in the ACD 40, it is routed to the web enabled agent, here one of agents 22a-22c. The ANI and the telephone number

(extension number) of the agent 22a-22c also exits the PBX 36 and travels to the T-server 42, where it is converted to a format recognizable by a CTI Driver 45, such that the ANI and the agent telephone (extension) number can be sent to the CTI driver 45 in the DC server 44. The telephone (extension) number of the agent 22a-22c, typically serves as the agent's cosurfer Identification, for both the agent audio call and the agent data call, as detailed below.

This CTI driver 45 is programmed to identify the ANI as an identifier for a data collaboration session, and not a country code, as per the E.164 Standard (above). The CTI driver then passes the ANI to the DC server 44, along with the number of the party, here the specific agent 22a-22c, to whom the audio (voice) call was connected.

On the agent side, a Cosurfer Data Collaboration (DC) Component, typically identical to that of the client 20 has been downloaded to the browser of each agent 22a-22c. Also, the specific agent 22a-22c has transmitted his cosurfer identification, here his telephone (extension) number, that corresponds to and serves as an identifier for his computer, into the DC server 44, by either sending it, via a data call, manually or via a conventional program over the Internet 24. As a result of sending his cosurfer identification, each agent is typically connected to the DC Server 44, via his cosurfer DC component.

The DC Server 44 has now received data corresponding to the ANI and agent telephone (extension) number of the now connected audio call between client 20 and specific agent 22a-22c. The DC server 44 has also received the ANI from the client's data call, at step 115a, and has also received the agent's cosurfer identification, here the agent's telephone extension number, as detailed above. The ANI data (the ANI's) of the client audio component and client data colloboartin component are matched, by convnetinal comparison programs, as are the teelphone (extension) number data (telephone numbers) of the agent 22a-22c audio component and agent data collaboration component. Convnetional matching software then matches the ANI data (ANI) associated with the client Data colloboartion component to the telephone (extension) number data (telephone number) associated with the agent data colloboration component. With this match complete, the DC server 44, executes a standard

program to connect the client 20 and the specific agent 22a-22c therein, allowing for the passage of data between the client 20 and the specific agent 22a-22c, resulting in the completion of the data call from the client to the specific web enabled agent 22a-22c, via the Internet 24.

This results in a data collaboration session on parallel voice and data channels, where the client 20 and the web enabled agent (one of 22a-22c) are in voice communication via the audio call (over the audio channel), as well as browsers coordinated to view same web site and/or page, via the data call (over the data channel). This data collaboration session allows for the sharing of web documents in conjunction with a voice conversation in real time. Additionally, the data collaboration session can include guided web browsing, where an agent can guide a customer to a web page, typically by transmitting a Uniform Resource Locator (URL), joint form handling, where call center agents assist a customer in filling out a form in real time, text chat, where agents and clients can exchange real time text messages and other similar functions.

Alternately, the present invention may employ an event handler, detailed in commonly assigned PCT Patent Application entitled: AN IMPROVED AUDIO AND DATA COLABORATION AND COORDINATION SYSTEM, filed on even date herewith and incorporated by reference herein, as part of the system, as shown and described in Fig. 1 above. The event handler is typically in the DC server 44. It functions to maintain the cosurfer connection between client 20 and agent 22a-22c in the absence of a browser connection on the client or agent side.

The methods and apparatus disclosed herein have been described with exemplary reference to specific hardware and/or software. The methods and apparatus have been described in a manner sufficient to enable persons of ordinary skill in the art to readily adapt other commercially available hardware and software as may be needed to reduce any of the embodiments of the present invention to practice without undue experimentation and using conventional techniques.

While preferred embodiments of the present invention have been described, so as to enable one of skill in the art to practice the present invention,

the preceding description is intended to be exemplary only. It should not be used to limit the scope of the invention, which should be determined by reference to the following claims.

Claims

What is claimed is:

1. A web enabled call center system comprising:

means for placing at least one first cosurfer identifier in at least one audio component for placement in an audio call of at least one sender and at least one data coloboration component for placement in a data call of said at least one sender;

at least one data collaboration server sever configured for:

receiving first data corresponding to said audio call from said at least one sender to said at least one receiver, said first data including at least said first cosurfer identifier and a second cosurfer identifier from said at least one receiver, said first cosurfer identifier being different than said second cosurfer identifier;

receiving second data including said first cosurfer identifier, from said data call from said at least one sender;

receiving third data including said second cosurfer identifier from a data call from said at least one receiver; and

processing said first, second and third data, to connect a data call from said at least one sender to at least one receiver, said data call between said at least one sender and said at least one receiver in parallel with said audio call between said at least one sender and said at least one receiver.

2. The system of claim 1, wherein said addressing server is additionally configured for:

completing a data call between said addressing server and said receiver once said first cosurfer identifier and said second cosufer identifier have been matched.

3. The system of claim 1, additionally comprising means for generating an Automatic Number Identification (ANI), said ANI defining said first cosurfer identifier.

4. The system of claim 3, wherein said means for generating an ANI includes first means for generating a first 3-digit number mimicking a country code and second means for generating a second 12-digit random number.

5. A method for conducting a data collaboration session over a wide area network comprising:

providing a sender with at least one audio component and at least one data collaboration component;

providing a first cosurfer identifier to at least one sender;

copying said first cosurfer identifier into said at least one audio component and said at least one data component;

sending said first cosurfer identifier by said at least one audio component, and a second cosurfer identifier from an intended receiver, said second cosurfer identifier different than said first cosurfer identifier, in accordance with an audio call between said at least one sender to at least one intended receiver;

sending said first cosurfer identifier to said at least one server by said data collaboration component in accordance with a data call;

connecting said data call from said at least one sender to a data call from said at least one intended receiver, after said intended receiver has transmitted said second cosurfer identifier to said at least one server, such that at least a portion of said data call between said sender and said at least one intended receiver is in parallel with said audio call between said at least one sender and said at least one intended receiver.

6. The method of claim 5, additionally comprising:

providing at least one server, said at least one server including a Data collaboration server.

7. The method of claim 5, wherein said step of providing a first cosurfer identifier to at least one sender includes generating an Automatic Number Identifier (ANI).

8. The method of claim 7, wherein said step of generating said ANI includes generating a 15 digit number.

9. The method of claim 8, wherein said step of generating a 15 digit number includes:

generating a first three digit number mimicking a country code in accordance with the E.164 telephony standard; and

generating a second twelve digit number, to follow said three digit number.

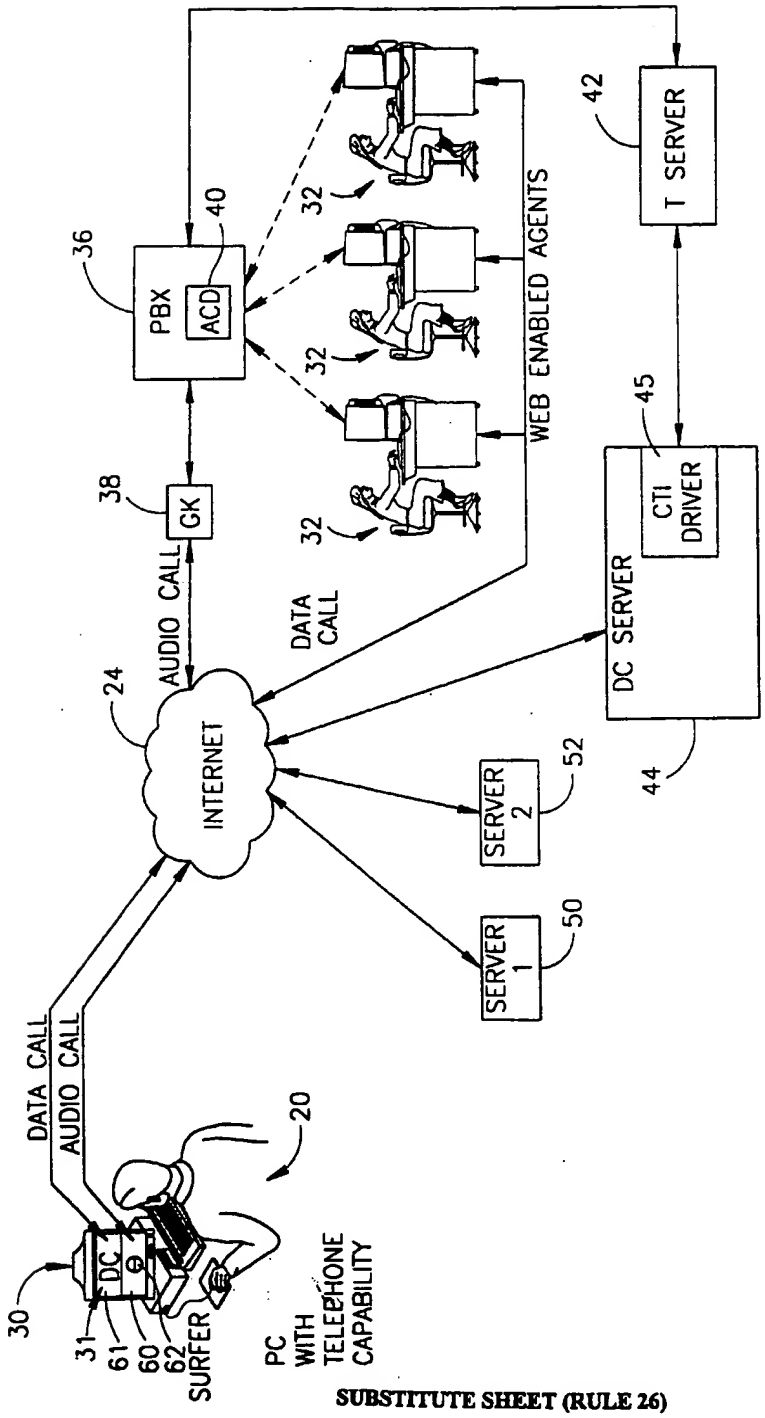
PBX
ACD
40
36
GK
38
AUDIO CALL
DATA CALL
INTERNET
24
WEB ENABLED AGENTS
32
32
32
T SERVER
42
CTI DRIVER
45
DC SERVER
44
SERVER 1
50
SERVER 2
52
DATA CALL
AUDIO CALL
20
DC
30
31
61
60
62
SURFER
PC WITH TELEPHONE CAPABILITY

FIG.1

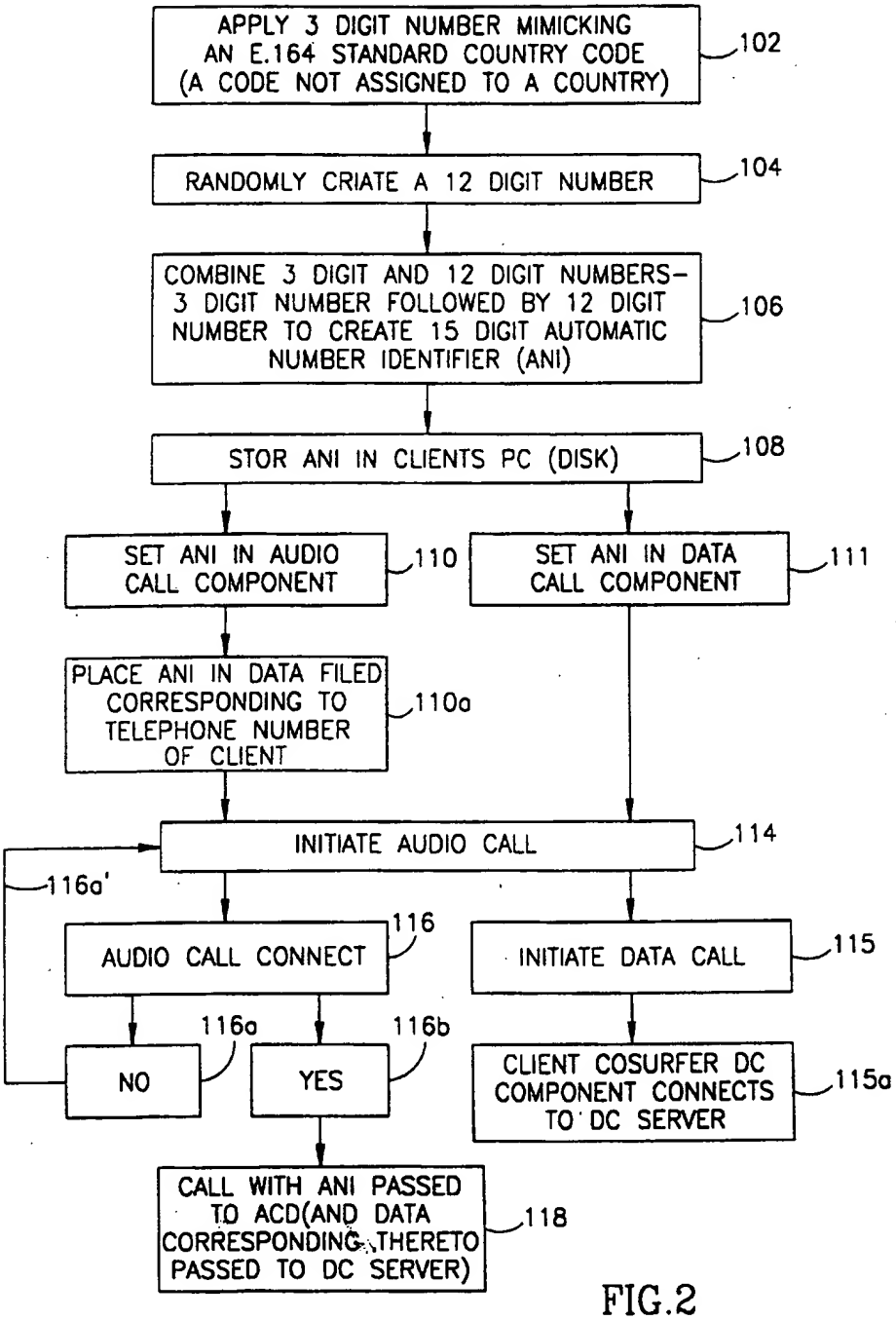
APPLY 3 DIGIT NUMBER MIMICKING AN E.164 STANDARD COUNTRY CODE (A CODE NOT ASSIGNED TO A COUNTRY)
102
RANDOMLY CRIATE A 12 DIGIT NUMBER
104
COMBINE 3 DIGIT AND 12 DIGIT NUMBERS- 3 DIGIT NUMBER FOLLOWED BY 12 DIGIT NUMBER TO CREATE 15 DIGIT AUTOMATIC NUMBER IDENTIFIER (ANI)
106
STOR ANI IN CLIENTS PC (DISK)
108
SET ANI IN AUDIO CALL COMPONENT
110
SET ANI IN DATA CALL COMPONENT
111
PLACE ANI IN DATA FILED CORRESPONDING TO TELEPHONE NUMBER OF CLIENT
110a
INITIATE AUDIO CALL
114
116a'
AUDIO CALL CONNECT
116
INITIATE DATA CALL
115
116a
116b
NO
YES
CLIENT COSURFER DC COMPONENT CONNECTS TO DC SERVER
115a
CALL WITH ANI PASSED TO ACD(AND DATA CORRESPONDING THERETO PASSED TO DC SERVER)
118

FIG.2

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IL00/00162

A. CLASSIFICATION OF SUBJECT MATTER
IPC(7) :H04M 11/00, 3/42
US CL :379/93.09, 90.01, 201
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 379/93.09, 90.01, 201

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EAST

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,557,667 A (BRUNO et al) 17 September 1996, col. 1, lines 34-58, col. 2, lines 14-26, col. 5, lines 26-67, col. 6, lines 27-43, and col. 9, line 63 - col. 11, line 40.	1-9
A	US 5,359,645 A (KATZ) 25 October 1994, Abstract, col. 5, lines 32-49, col. 7, lines 32-51, col. 8, line 65 - col. 9, line 29, and col. 10, line 60 - col. 11, line 29.	1-9

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

*	Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E"	earlier document published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search	Date of mailing of the international search report
20 JUNE 2000	03 JUL 2000
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer LE HIEN LUU James R. Matthews Telephone No. (703) 305-9650

Form PCT/ISA/210 (second sheet) (July 1998)*